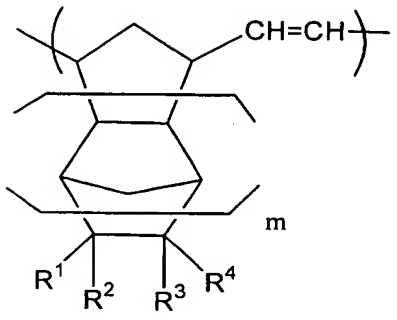
CLAIMS

1. A norbornene ring-opened polymer in which having a repeating unit represented by the formula (1):

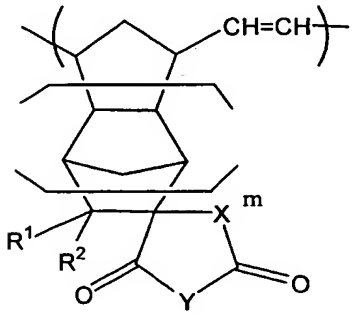


(1)

wherein R^1 represents Q, R^2 represents Q or $C(=O)R^5$, R^3 represents Q or $C(=O)R^6$, and R^4 represents Q or $X-C(=O)R^7$, wherein Q represents a hydrogen atom or a hydrocarbon group having 1-10 carbon atoms which may be substituted with a hetero atom-containing functional group or a halogen atom, R^5, R^6, and R^7 individually represent a hydroxyl group or an alkoxyl group having 1-10 carbon atoms which may be substituted with a hetero atom-containing functional group or a halogen atom, or R^6 and R^7 may be bonded together to form an oxygen atom, a sulfur atom, or NR^8, wherein R^8 represents a hydrogen atom, a hydroxyl group, a substituted or unsubstituted hydrocarbon group having 1-10 carbon atoms, an alkoxyl group having 1-10 carbon atoms, or an alkoxycarbonyl group having 1-10 carbon atoms, and X represents a substituted or unsubstituted alkylene group having 1-5 carbon

atoms, wherein, when R^2 is Q, R^3 is $C(=O)R^6$ and R^4 is $X\text{-}C(=O)R^7$, and, when R^4 is Q, R^2 is $C(=O)R^5$, R^3 is $C(=O)R^6$, and R^2 and R^3 are in the trans position; and m represents 0 or 1; the norbornene ring-opened polymer having a weight average molecular weight determined by gel permeation chromatography of 1,000-1,000,000.

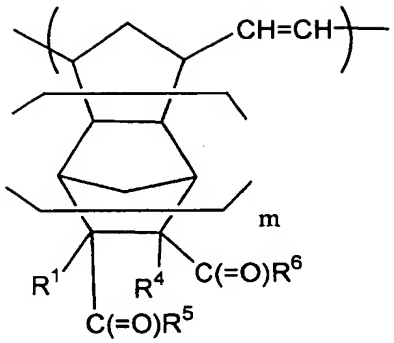
2. The polymer according to claim 1, wherein the repeating unit represented by the formula (1) is a repeating unit represented by the formula (2):



(2)

wherein R^1, R^2, X, and m are the same as defined in claim 1, and Y represents an oxygen atom, a sulfur atom, or NR^8, wherein R^8 is the same as claimed in claim 1.

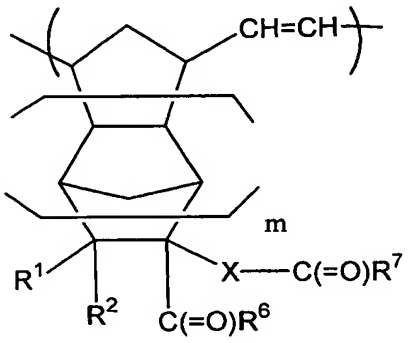
3. The polymer according to claim 1, wherein the repeating unit represented by the formula (1) is a repeating unit represented by the formula (3):



(3)

wherein R^1, R^4, R^5, R^6 and m are the same as claimed in claim 1, and the group of the formula: $C(=O)R^5$ and the group of the formula: $C(=O)R^6$ are in the trans position.

4. The polymer according to claim 1, wherein the repeating unit represented by the formula (1) is a repeating unit represented by the formula (4):

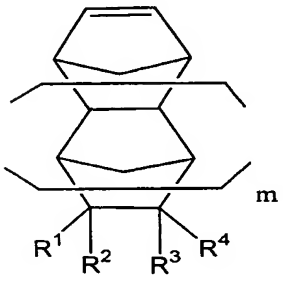


(4)

wherein R^1, R^2, R^6, R^7, X, and m are the same as claimed in claim 1.

5. The polymer according to claim 4, wherein the repeating units represented by the formula (4) comprises the repeating units possessing the group of the formula: $C(=O)R^6$ in the exo position in an amount of 70 mol% or more.

6. A process for producing the norbornene ring-opened polymer comprising polymerizing a norbornene monomer of the formula (5) by ring-opening metathesis polymerization in the presence of a metathesis polymerization catalyst,

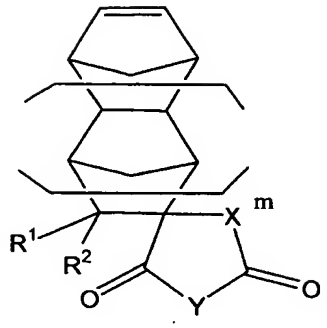


(5)

wherein R^1-R^4 and m are the same as defined above.

7. The process according to claim 6, wherein the metathesis polymerization catalyst used is a ruthenium-carbene complex catalyst.

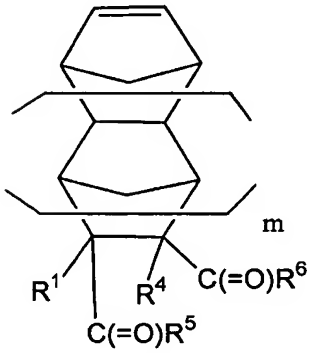
8. The process according to claim 6 or 7, wherein the norbornene monomer of the formula (5) used is a monomer of the formula (6):



(6)

wherein R^1, R^2, X, Y, and m are the same as defined above.

9. The process according to claim 6 or 7, wherein the norbornene monomer of the formula (5) used is a monomer of the formula (7):

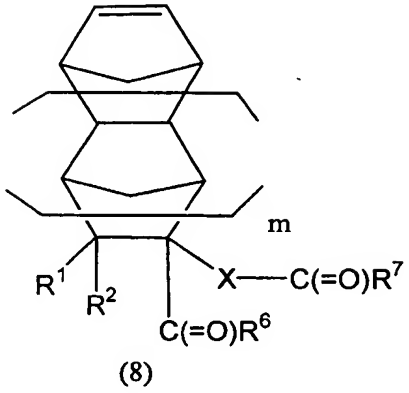


(7)

wherein R^1, R^4, R^5, R^6 and m are the same as defined above, and the group of the formula: $C(=O)R^5$ and the group of the formula: $C(=O)R^6$ are in the trans position.

10. The process according to claim 6 or 7, wherein the

norbornene monomer of the formula (5) used is a monomer of the formula (8):



(8)

wherein R^1, R^2, R^6, R^7, X, and m are the same as defined above.

11. The process according to claim 10, wherein the norbornene monomer of the formula (8) used comprises the monomer possessing the group of the formula: $C(=O)R^6$ in the exo position in an amount of 70 mol% or more.

12. A hydrogenated product of a norbornene ring-opened polymer obtained by hydrogenating carbon-carbon double bonds in the polymer according to any one of claims 1-5, in which 50% or more of the double bonds are hydrogenated.

13. A process for producing a hydrogenated product of a norbornene ring-opened polymer, comprising hydrogenation of carbon-carbon double bonds in the polymer according to any one of claims 1-5 in the presence of a hydrogenation catalyst.